# Overview

This item covers ideas that are also part of the KS3 curriculum. Students observe a range of specialised cells. They learn about the seven characteristics of life, the organisation of cells into tissues and organs, and the role of different organ systems. They learn about new cells and stem cells.

The activity sheets for this item include exercises to check understanding.

### Activity ELB 1a *Being alive*

**Requirements** *(for the class):*

* Activity sheet ELB 1a each

**Teaching notes:** A walk in the school grounds is useful to stimulate discussion on characteristics of life – for example, comparing the life processes of students with those of lichens on a tree, or moss on a stone.

### Activity ELB 1c&1d *What are animals made of?*

## Cell contents

**Teaching notes:** This activity reminds students of the essential contents of an animal cell.

## Different cells for different jobs

**Requirements** *(for the class):*

* Activity sheet ELB1c&d each
* selected prepared microscope slides of human tissue, and/or Bioviewer strips
* light microscopes
* (optional) lamps (PAT tested)
* Bioviewers

**Teaching notes:** Use a circus of prepared slides or Bioviewer strips to show a range of specialised human cells. It is not necessary for students to make notes about each type of cell. They should look for similarities between the cells, and things that are different, e.g. cells all have nuclei, different types of cells are different shapes. This [interactive game](https://www.nationalgeographic.org/interactive/cell-explorers/) could be used as an alternate way to introduce or revise cell structures. It does contain structures students do not need to know, but could be an extension or homelearning activity.

**Health and safety notes:**

Emphasise the importance of focusing the microscope from the lowest position (just above the slide) upwards, to avoid damage to the slide or lens.

### Activity ELB 1b *Organ systems*

**Requirements** *(per group):*

* Activity sheet ELB 1b (sheet 1) each
* two large sheets of sugar paper joined together
* marker pen

**Teaching notes:** The paper is laid on a bench.
A student lies on the paper with legs together. Another student draws around an outline of their body. The group should then mark on the outline where they think the following organs are located, and their approximate size: brain, heart, kidneys, stomach, lungs, liver. Comparing students’ outlines to a textbook or online image often shows some interesting misconceptions!

### *Cells work together*

**Requirements** *(for the teacher):*

* chicken wing
* dissecting board
* dissecting scissors
* disinfectant and paper towels

*(per student)*

* Activity sheet ELB 1b (sheet 2)

**Teaching notes:** Demonstrate the dissection of a chicken wing to identify different tissues, e.g. muscle, tendon, bone. The chicken wing structure is very similar to a human elbow joint. Movement of the joint can be demonstrated by pulling on the front or back muscle (equivalent to the biceps and triceps muscle).

**Health and safety notes:**

Hands and equipment should be washed thoroughly after being in contact with chicken.

Wipe bench with disinfectant.

### Activity ELB 1f-1h *Making cells*

**Requirements***:*

* Activity sheet ELB 1f-h each
* (optional) scissors and glue
* calculator

**Teaching notes**: Introduce the idea of making new cells using this [video](https://www.youtube.com/watch?v=f-ldPgEfAHI&t=288s). The first two minutes are particularly relevant. You could go onto watch the next two minutes if you want to extend the students, or provide them with GCSE Biology knowledge.

Students will need to know why cell division is needed, and how it can lead to cancer. You may need to approach the topic of cancer sensitively. This [TED-Ed](https://www.youtube.com/watch?v=BmFEoCFDi-w) talk could be used to reinforce the idea of how cancer occurs.

### Activity ELB 1j-1k *Stem cells*

**Requirements***:*

* Activity sheet ELB 1j-k each

**Teaching notes:** This topic can be challenging to introduce. Students need to know what stem cells are and that they can be used in medicine. No further detail is required unless you choose to extend to GCSE Biology knowledge.

This [video](https://www.youtube.com/watch?v=K7D6iA7bZG0) illustrates how stem cells can be used in medicine, as well as explaining what stem cells are. The first 1 minute of this [video](https://www.youtube.com/watch?v=9db44fBrWrE) could be used to introduce the idea of stem cells. The video goes on to discuss ethical considerations, which could be stimulating for the discussion outlined below.Definitions and Discussion

1. **Meanings of words**

**Cell:** the small units that living things are made of. Some living things are only one cell big. Others have millions of cells.

**Tissue:** a group of the same kind of cell joined together to do a job.

**Organ:** part of the body made of different tissues.

**Organ system:** several organs working together to do complex jobs, e.g. the digestive system.

1. Discussion points

**Only living things can make copies of themselves.** Automated manufacturing lines could be suggested as examples of objects being made by non-living systems. Simple robots can be programmed to build copies of themselves.

**Stem cells should be used for medicine** Encourage students to think about different approaches people may take to this decision.
For example, for some people think stem cells in medicine is unnatural, and they should not be carried out. However, some think that it could cure diseases which currently have no cure, so would be good to use.



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